June 17, 1988

Docket No.: 50-293

Boston Edison Company
ATTN: Mr. Ralph G. Bird
Senior Vice President - Nuclear
800 Boylston Street
Boston, Massachusetts 02199

Dear Mr. Bird:

SUBJECT: ISSUANCE OF AMENDMENT NO. 118 TO FACILITY OPERATING LICENSE NO. DPR-35 (TAC NO.62850) FOR PILGRIM NUCLEAR POWER STATION

The Commission has issued the enclosed Amendment No.118 to Facility Operating License No. DPR-35 for the Pilgrim Nuclear Power Station. This amendment consists of changes to the Technical Specifications in response to your application dated September 9, 1986.

This amendment modifies Technical Specification Tables 3.1.1 and 3.2.A to accommodate installation of a hydrogen water chemistry system at Pilgrim Station.

A copy of our Safety Evaluation is also enclosed. The Notice of Issuance will be included in the Commission's Bi-Weekly Federal Register Notice.

Sincerely,

/S/

Daniel G. McDonald, Senior Project Manager
Project Directorate I-3
Division of Reactor Projects I/II

Enclosures:
1. Amendment No. 118 to DPR-35
2. Safety Evaluation

cc w/enclosures:
See next page

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UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

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Daniel G. McDonald, Senior Project Manager
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See next page

cc:

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UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

BOSTON EDISON COMPANY

DOCKET NO. 50-293

PILGRIM NUCLEAR POWER STATION

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 118
License No. DPR-35

1. The Nuclear Regulatory Commission (the Commission) has found that:

   A. The application for amendment by Boston Edison Company (the licensee) dated September 9, 1986 complies with the standards and requirements of the Atomic Energy Act of 1954, as amended (the Act), and the Commission's rules and regulations set forth in 10 CFR Chapter I;

   B. The facility will operate in conformity with the application, the provisions of the Act, and the rules and regulations of the Commission;

   C. There is reasonable assurance (i) that the activities authorized by this amendment can be conducted without endangering the health and safety of the public, and (ii) that such activities will be conducted in compliance with the Commission's regulations;

   D. The issuance of this amendment will not be inimical to the common defense and security or to the health and safety of the public; and

   E. The issuance of this amendment is in accordance with 10 CFR Part 51 of the Commission's regulations and all applicable requirements have been satisfied.

2. Accordingly, the license is amended by changes to the Technical Specifications as indicated in the attachment to this license amendment, and paragraph 3.B of Facility Operating License No. DPR-35 is hereby amended to read as follows:

   (2) Technical Specifications

   The Technical Specifications contained in Appendix A, as revised through Amendment No. 118 , are hereby incorporated in the license. The licensee shall operate the facility in accordance with the Technical Specifications.

3. This license amendment is effective 30 days after the date of issuance.

FOR THE NUCLEAR REGULATORY COMMISSION

Richard H. Wessman, Director
Project Directorate I-3
Division of Reactor Projects I/II

Attachment:
Changes to the Technical
Specifications

Date of Issuance: June 17, 1988

ATTACHMENT TO LICENSE AMENDMENT NO. 118

FACILITY OPERATING LICENSE NO. DPR-35

DOCKET NO. 50-293

Replace the following pages of the Appendix A Technical Specifications with the enclosed pages. The revised pages are identified by amendment number and contain vertical lines indicating the areas of change.

Remove Pages	Insert Pages
29	29
46	46

NOTES FOR TABLE 3.1.1 (CONT'D)

10. Not required to be operable when the reactor pressure vessel head is not bolted to the vessel.

11. Deleted

12. Deleted

13. An APRM will be considered inoperable if there are less than 2 LPRM inputs per level or there is less than 50% of the normal complement of LPRM's to an APRM.

14. W is percent of drive flow required to produce a rated core flow of 69 Mlb/hr. Trip level setting in percent of design power (1998 MWt).

15. See Section 2.1.A.1.

16. The APRM (15%) high flux scram is bypassed when in the run mode.

17. The APRM flow biased high flux scram is bypassed when in the refuel or startup/hot standby modes.

18. Within 24 hours prior to the planned start of hydrogen injection with the reactor power at greater than 20% rated power, the normal full power radiation background level and associated trip setpoints may be changed based on a calculated value of the radiation level expected during the injection of hydrogen. The background radiation level and associated trip setpoints may be adjusted based on either calculations or measurements of actual radiation levels resulting from hydrogen injection. The background radiation level shall be determined and associated trip setpoints shall be set within 24 hours of re-establishing normal radiation levels after completion of hydrogen injection and prior to withdrawing control rods at reactor power levels below 20% rated power.

NOTES FOR TABLE 3.2.A

1. Whenever Primary Containment integrity is required by Section 3.7, there shall be two operable or tripped trip systems for each function.

2. Action

   If the first column cannot be met for one of the trip systems, that trip system shall be tripped. If the first column cannot be met for both trip systems, the appropriate action listed below shall be taken.

   A. Initiate an orderly shutdown and have the reactor in Cold Shutdown Condition in 24 hours.

   B. Initiate an orderly load reduction and have Main Steam Lines isolated within eight hours.

   C. Isolate Reactor Water Cleanup System.

   D. Isolate Shutdown Cooling.

3. Instrument set point corresponds to 129.5" above top of active fuel.

4. Instrument set point corresponds to 78.5" above top of active fuel.

5. Not required in Run Mode (bypassed by Mode Switch).

6. Two required for each steam line.

7. These signals also start SBGTS and initiate secondary containment isolation.

8. Only required in Run Mode (interlocked with Mode Switch).

9. Within 24 hours prior to the planned start of hydrogen injection with the reactor power at greater than 20% rated power, the normal full power radiation background level and associated trip setpoints may be changed based on a calculated value of the radiation level expected during the injection of hydrogen. The background radiation level and associated trip setpoints may be adjusted based on either calculations or measurements of actual radiation levels resulting from hydrogen injection. The background radiation level shall be determined and associated trip setpoints shall be set within 24 hours of re-establishing normal radiation levels after completion of hydrogen injection and prior to withdrawing control rods at reactor power levels below 20% rated power.

UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

RELATED TO AMENDMENT NO. 118

TO FACILITY OPERATING LICENSE NO. DPR-35

BOSTON EDISON COMPANY

PILGRIM NUCLEAR POWER STATION

DOCKET NO. 50-293

1.0 INTRODUCTION

By letter dated September 9, 1986, Boston Edison Company (BECo) the licensee, submitted a request for change to the Pilgrim Nuclear Power Station Technical Specifications (TS). The requested change modifies the Technical Specifications to accommodate installation of a hydrogen water chemistry (HWC) system, which is intended to mitigate intergranular stress corrosion cracking (IGSCC) of stainless steel piping in the reactor coolant system.

The Pilgrim Technical Specifications will require change because the radiation level adjacent to the main steam lines will increase as a result of the addition of hydrogen to the reactor coolant. The radiation level adjacent to the main steam lines is monitored by instruments whose trip setting is specified in the Technical Specifications and will have to be increased.

2.0 EVALUATION

2.1 High Radiation Scram and Isolation Set Points

The Main Steam Line Radiation Monitors (MSLRMs) provide reactor scram as well as reactor vessel and primary containment isolation signals upon detection of high radioactivity in the main steam lines. Additionally, these monitors serve to limit radioactivity released in the event of fuel failure. The proposed Technical Specifications would change note (18) to table 3.1.1 and note (9) to table 3.2.A (Attachment 1) by deleting the word "test" wherever it appears in current Technical Specifications. The change would also allow adjustments to the normal background radiation level and associated trip setpoints for the MSLRMs at reactor power levels greater than 20 percent. The adjustments will be based on either calculation or measurement of actual radiation levels resulting from increased N-16 levels in the main steam lines due to hydrogen injection. Within 24 hours of re-establishing normal radiation levels after completion of hydrogen injection, or prior to withdrawing control rods at reactor power levels below 20 percent rated power, the background radiation level shall be determined and associated trip setpoints shall be reset.

The licensee states that the only design basis accident that takes credit for the MSLRM trip is the design basis control rod drop accident (CRDA). Generic analysis of the consequences of a CRDA have shown that fuel failures are not expected from a CRDA occurring at greater than 10 percent power. This is primarily a result of analyses that show that as power increases the severity of the CRDA decreases due to the effects of increased void formation and increased Doppler negative reactivity feedback. Since hydrogen injection will be limited to above 20 percent of rated power and the increased MSLRM trip setpoint will be reduced to normal levels below 20 percent, the staff concludes that the currently approved CRDA analysis for the Pilgrim Nuclear Power Station is appropriately bounded and remains valid. Therefore, the proposed Technical Specification change is acceptable.

2.2 Radiation Protection

The staff has reviewed the proposed Technical Specification change to assure that the licensee has considered the radiological implications of dose rate increases associated with N-16 activity increases due to hydrogen injections into the reactor system. Extensive plant interior and exterior radiation surveys were conducted during the HWC pre-implementation test, which was performed during May 1985 at the Pilgrim Station. At full power with HWC, the MSLRMs increased by a factor of four over the normal BWR chemistry conditions. Additional shielding was installed in the turbine building to minimize this effect in the main turbine area. The increased radiation levels near feedwater heaters and condenser bay have been minimized through installation of shielding and/or procedural controls. Maintenance activities in high radiation areas resulting from HWC can be accomplished by interrupting or reducing hydrogen injection, since radiation levels will decrease in less than a minute to normal. An interruption or reduction in HWC for up to about 8 hours will not affect the reactor coolant piping protection against IGSCC provided by HWC.

Environmental dose rate measurements during the HWC pre-implementation test indicated that at 1100 to 1500 feet from the center of the turbine, the dose rate was not affected. Turbine and turbine building shielding will further reduce environmental dose rates. The permanent HWC system will be operated to ensure ALARA in accordance with Regulatory Guide 8.8 and is, therefore, acceptable.

2.3 Hydrogen Generation and Distribution System

The licensee has installed a hydrogen and oxygen injection system to implement permanent HWC at Pilgrim. The primary hydrogen and oxygen supply is generated on-site by electrolytic cells. As a backup for the electrolytic system, the extended test system will be used. The extended test system consists of a compressed hydrogen gas and liquid oxygen storage facility. The compressed hydrogen gas storage facility is located 290 feet from the nearest safety related structure (battery room located inside turbine building) and consists of nine high pressure storage tanks having a total capacity of 72,000 standard cubic feet. The 1500 gallon liquid oxygen tank is located outside the turbine building. The separation distance between the hydrogen cylinders and safety related structures meets the BWR Owners Group, "Guidelines for Permanent BWR

Hydrogen Water Chemistry Installations," 1987 Revision.

The hydrogen injection system contains excess flow check valves to limit the release of hydrogen in the event of a pipe break. Hydrogen will be injected into the feedwater system at the suction side of the condensate feed pumps. To prevent the accumulation of combustible levels of hydrogen at the condensate booster pumps, near the control valves and at various strategic locations along the supply lines, the hydrogen injection system will be leak tested prior to use and will be monitored for hydrogen concentrations during operation. The monitors will alarm when hydrogen concentration exceeds 2 percent and will isolate the hydrogen supply line when the hydrogen concentration reaches 4% to prevent reaching a potentially explosive concentration.

As part of the HWC system, oxygen is injected into the off-gas system to ensure that all excess hydrogen in the off-gas stream is recombined. Oxygen injection into the suction piping of the condensate pumps is also available to maintain recommended dissolved oxygen concentrations of 20-50 ppb for feedwater piping corrosion control.

2.4 Site Visit

The staff visited Pilgrim Station on August 20, 1987 to review the design and installation of the HWC system. System diagrams were reviewed and the system was inspected. The electrolytic and gaseous storage facilities, hydrogen and oxygen injection systems, instrumentation and controls, and safety considerations are consistent with the "Guidelines for Permanent BWR Hydrogen Water Chemistry Installations," 1987 Revision.

3.0 ENVIRONMENTAL CONSIDERATIONS

This amendment involves a change in the installation or use of a facility component located within the restricted area as defined in 10 CFR Part 20. The staff has determined that the amendment involves no significant increase in the amounts, and no significant change in the types, of any effluents that may be released offsite, and that there is no significant increase in individual or cumulative occupational radiation exposure. The Commission has previously published a proposed finding that the amendment involves no significant hazards consideration and there has been no public comment on such finding. Accordingly, the amendment meets the eligibility criteria for categorical exclusion set forth in 10 CFR §51.22(c)(9). Pursuant to 10 CFR §51.22(b), no environmental impact statement or environmental assessment need be prepared in connection with the issuance of this amendment.

4.0 CONCLUSION

We have concluded, based on the considerations discussed above, that (1) there is reasonable assurance that the health and safety of the public will not be endangered by operation in the proposed manner, and (2) such activities will be conducted in compliance with the Commission's regulations, and the issuance of this amendment will not be inimical to the common defense and security or to the health and safety of the public.

Principal Contributor: F. Witt

Dated: June 17, 1988